

## Remarks

Claims 62-66, 75-77, 79-83, 90-91, and 94-96 were rejected under 35 USC 102(b) over Auge, II (US 2002/0022846). Claims 67, 78, 84-85, 92-93 were rejected under 35 USC 103(a) over Auge. Applicants traverse these rejections for the following reasons:

1. Independent Claim 62 (as well as independent Claims 75, 80 and 94) as amended are directed to the process of modification of dental hard tissue. Auge does not describe a method of hard tissue modification. Auge describes the method of fusing or welding two pieces of bone together – one piece being an implant made of a bone material to an in vivo bone. For example, here is what is disclosed in Abstract of Auge:

“A method of fusing or welding bone in vivo and in a fluid medium, comprising: harvesting a piece of autologous implant bone; treating the implant bone and/or a receiving bone to expose organic component; treating the implant bone and/or the receiving bone by de-fattening; combining the implant bone with other compounds to create an interfacing agent; adding the interfacing agent between receiving bone segments to be fused or welded; and fusing or welding in vivo, in a fluid medium, utilizing electromagnetic energy.” (emphasis added)

Applicants point out that their invention as claimed in the referenced Claims is not directed to two pieces of bone fused to one another. For example, Claim 62 is directed to “selectively heating a porous layer of the dental hard tissue to cause the porous layer to fuse”. This had nothing to do with fusing a bone implant to a bone, as described in Auge. Claim 75 is directed to impregnating the porous layer with particles and fusing the layer and the particles. This has nothing to do with fusing a bone implant to a bone, as described in Auge.

Applicants also draw the attention of the Patent Office to the fact that the porous structure of a bone in Auge and a structure of dental hard tissue in the referenced amended independent Claims are very different from each other in chemical composition, porosity and many other parameters. For example, dental hard tissue, such as enamel or

dentine or cement of a tooth, contains no blood vessels and requires no healing process, contrary to what is described with regard to a bone in paragraph [0026] of Auge:

“Therefore, an additional primary advantage of the present invention is to provide a means to achieve sufficient joining strength between bone segments such that supplemental fixation devices are not required during the healing process whereby eliminating the sequelae of such devices.” (emphasis added)

Applicants also respectfully note that the term “dental hard tissue” (being dentine, enamel, cement) is a well-known and defined term in dentistry, see, for example, this term used in various materials of the American Dental Association (Exhibit 1). Therefore, the Auge method of welding two pieces of bone to each other (a bone implant to a bone) cannot be considered as a 102(b)/103(a) publication against a method of dental hard tissue modification of independent amended Claims 62, 75, 80, 94 and their dependent Claims.

Also, Auge fails to disclose a superficial porous layer of nay structure. In [0029] Auge discloses “the large porous interstices 220 (Fig. 2)”, which are fundamental characteristics of a volume structure of a bone (as also can be seen in Fig. 1, for example). Therefore, the referenced amended independent Claims and their dependent Claims directed to a superficial porous lawyer cannot be disclosed or taught by Auge.

Also, the heating process described in Auge cannot be applied to or used in the present invention. Specifically, in [0047] Auge describes that “[S]econdary probe configurations provide for more concentrated localized flux fields that treat highly specific areas to promote final fixation through higher levels of heating to the specific treatment zone.” It is not possible to localize flux as used in Auge on the superficial porous layer of dental hard tissue (of a tooth) and perform any kind of selective heating.

Also, paragraphs [0049] and [0051] of Auge do not disclose impregnating the superficial porous layer of dental hard tissue with particles having a fluidity temperature

higher or same than a melting temperature of a hard tissue of the porous layer, as is claimed in the referenced Claims. In paragraph [0046] Auge writes that:

"Further, the addition of compounds or growth factors to this post-treated autologous bone graft material, such as but not limited to hydroxyapatite, osteogenic protein, hormones-like substances, insulin-like growth factors, prostaglandins, chemical mediators, cellular chemotactic substances, transvection vehicles, and other factors to control gene expression, within this bone-derived substance that would promote, stimulate, or induce various healing properties via osteoconductive, osteoinductive, or other methods. Such substances may also be activated by the particular electromagnetic energy source used in the fusion/welding process, such as release from heat-activated microspheres. This complex is additionally combined with a hydrophobic, lipophilic carrier paste-gel-like substance that allows use in a fluid environment. This paste-gel is composed of an ionic substrate that transmits radio frequency energy via its electrolytic properties and is composed specifically for the particular area of treatment and mode of radio frequency use. Materials such as sodium chloride, potassium chloride, or similar ion-liberating based solutions, compounds, or substances are acceptable media and can be combined with specific paste-gel-like carriers. The substrate may exceed the ionic and electrolytic concentration of surrounding tissue and fluid allowing radio frequency energy transmission to be preferential to the substrate and away from normal tissue and surrounding fluids further limiting the potential for collateral damage and unwanted energy application (in addition to the natural insulating effects of natural bone to radio frequency energy), i.e., the path of least resistance or impedance. Additionally, a visualization aid, additive, or dye is included as disclosed above."

None of those described compounds is has anything to do with (or can be) crystal, ceramic or glass particles claimed in the referenced Claims, and none are characterized by a melting temperature. This is logical, because Auge's described fusing or welding process does not have anything to do with melting of any compound. The role of different compounds in Auge is to promote, stimulate, or induce various healing properties, or to be activated by a particular electromagnetic energy, or to transmit radio frequency energy via their electrolytic properties. This is completely different from the subject matter of the referenced Claims.

Therefore, for all the reasons presented above, Applicants assert Auge does not disclose each and every element of the inventions claimed in Claims 62-66, 75-77, 79-83, 90-91, and 94-96. Therefore, the referenced Clams are patentable under 35 USC 102(b) over Auge and should be allowed. For the same above-articulated reasons Claims 67, 78,

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84-85, 92-93 are patentable under 35 USC 103(a) over Auge. Allowance of the referenced Claims is requested.

Claims 87, 89 were rejected under 35 USC 102(b) over Evans et al (US 5,104,319). Applicants traverse this rejection for the following reasons.

Evans fails to disclose a method of dental hard tissue modification. Evans describes a method of manufacturing dental restoration (veneers, crowns, inlays, onlays and bridges), which is completely unrelated to the claimed method of hard tissue modification. As explained above, dental hard tissue pertains to a live tooth (dentine, enamel, cement), which is a part of a human. Treatment of dental hard tissue is a field which is completely different from the field of fabrication of dental restoration. In Col. 4, lines 8-14, Evans describes treatment with a flame spray, which cannot possibly be applicable to a treatment of dental hard tissue (no one can realistically think of inserting a flame spray into a mouth as a clinical procedure). Therefore, Claims 87, 89 are patentable under 35 USC 102(b) over Evans, and should be allowed.

It is believed that the present application is in condition for allowance. A Notice of Allowance is respectfully solicited. Should any questions arise, the Examiner is encouraged to contact the undersigned.

Respectfully submitted,  
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